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French et al.

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(54) **RIGID STING EXTENSION FOR OCEAN
TURBULENCE MEASUREMENT FROM AN
UNMANNED UNDERWATER VEHICLE**

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(58) **Field of Search** **367/131, 173,
367/154, 153; 114/20.1, 21.3; 73/861.21,
861.23, 861.24; 102/402, 403**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,079,687 A * 3/1978 Mentcher **114/20.**

4,192,246 A * 3/1980 Hodges et al. ... **114/20.1**
5,363,343 A * 11/1994 Klein **367/173**
5,425,001 A * 6/1995 Polvani **114/21.3**
5,602,801 A * 2/1997 Nussbaum et al. **367/165**
5,657,296 A * 8/1997 Carter **367/173**
5,717,658 A * 2/1998 Carter **367/173**

* cited by examiner

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(57) **ABSTRACT**

The present invention relates to a system for collecting ocean turbulence data without interference from the hydrodynamic effects of the vehicle. The ocean turbulence data collection system comprises an underwater vehicle, such as an unmanned underwater vehicle, at least one sensor for collecting the ocean turbulence data, and a stinger arrangement mounted to the nose portion of the vehicle for positioning the at least one sensor sufficiently forward of the nose portion of the vehicle to avoid interference from the hydrodynamic effects of the vehicle. The collection system is also provided with at least one accelerometer for compensating for motion not induced by turbulence.

14 Claims, 2 Drawing Sheets

